

600 Volt Stretched Lens Array for Solar Electric Propulsion, Phase II

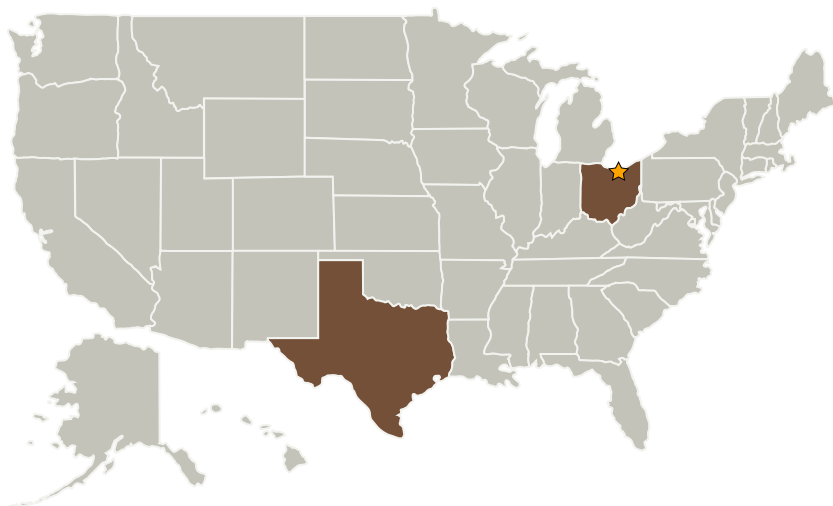
Completed Technology Project (2007 - 2009)



Project Introduction

ENTECH, Auburn, NASA, and others have recently developed a new space photovoltaic array called the Stretched Lens Array (SLA), offering unprecedented performance (>80 kW/cu.m. stowed power, >300 W/sq.m. areal power, and >300 W/kg specific power) and cost-effectiveness ($>75\%$ savings in \$/W compared to planar arrays). SLA achieves these outstanding attributes by employing flexible Fresnel lenses for optical concentration (e.g., 8X), thereby minimizing solar cell area, mass, and cost. SLA's small cell size (85% less cell area than planar high-efficiency arrays) also allows super-insulation and super-shielding of the solar cells to enable high-voltage operation and radiation hardness in the space environment. Recent studies show that SLA offers a 3-4X advantage over competing arrays in specific power for many NASA Exploration missions, and that SLA is ideally matched to Solar Electric Propulsion (SEP) applications, which can save NASA $>\$10$ billion for lunar exploration cargo transportation. In Phase II, ENTECH and Auburn will perform critical ground tests, including an advanced solar concentrator (1 kW, 600 V, color-mixing lenses, multi-junction cells) direct-driving a Hall-effect electric thruster, and SLA/thruster plume interaction tests. After Phase II, SLA for SEP technology will be ready for flight testing in preparation for many NASA, DOD, and commercial missions.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
ENTECH, Inc.	Supporting Organization	Industry	Keller, Texas

Primary U.S. Work Locations

Ohio	Texas
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.1 Photovoltaic